

## Design & Technology Curriculum



### **Intent:**

At Corporation Road, through design and technology children use creativity and imagination to design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. At Corporation Road, we would like children to draw on skills from a range of subjects such as mathematics, science, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens.

Design and technology education begins well before children begin their formal schooling. Children constantly explore their world through a variety of activities and it is vital for us to continue to extend this. The child's increasing understanding of the process of design and technology should match their intellectual and physical development throughout their primary education.

### **We intend to:**

- Use creativity and innovation to design purposeful and appealing products for themselves and for others that solve real and relevant problems within a variety of contexts.
- Use a range of tools, safely, confidently and skilfully, selecting on a fit for purpose basis.
- Articulate their ideas in a variety of formats.
- Evaluate their work against a design criteria, considering their own and others' views in how to modify and improve work whilst demonstrating resilience and respect.
- Develop a critical understanding of the impact of design on our daily lives through a study inventors, designers, engineers and chefs who have developed ground breaking products.
- To have fun, be challenged, work with others and learn in a practical context
- Leave KS2 with a firm grasps of the design, make, evaluate cycle, through the 5 key areas of DT:
  - o Food Technology
  - o Textiles
  - o Structures
  - o Mechanisms
  - o Electrical Systems (linked to Computing curriculum)
- The curriculum is supported and delivered through the DT Association advocated approach of 'Projects on a Page'.

	Autumn	Spring	Summer
EYFS	<p><b>ELGS that feed into Art and Design: Expressive Arts and Design</b></p> <p><i>Creating with Materials</i> – The children can safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. They share their creations, explaining the process/es they have used. The children make use of props and materials when role playing characters in narratives and stories.</p> <p><i>Being Imaginative and Expressive</i> – The children invent, adapt and recount narratives and stories with peers and their teacher. They sing a range of well-known nursery rhymes and songs. The children perform songs, rhymes and stories with others, and, when appropriate, try to move in time with music.</p>		
Year 1	<p><b>Toys</b></p> <p>Freestanding Structures: Making a toy robot</p>	<p><b>People Who Help us</b></p> <p>Preparing Fruit and Vegetables: Making a sandwich</p>	<p><b>The Park</b></p> <p>Sliders and Levers: Moving Pictures</p>
Year 2	<p><b>Transport</b></p> <p>Freestanding Structures: Making a Chair</p>	<p><b>Dirty Beasts</b></p> <p>Templates and joining: Wash Bag</p>	<p><b>The Seaside</b></p> <p>Wheels and Axles: Making a vehicle</p>
Year 3	<p><b>Stone Age / Darlington – Local Study</b></p> <p>Shell Structures: Gift Box representing Darlington</p>	<p><b>The Rainforest</b></p> <p>Pneumatics: Moving animals in the rainforest</p>	<p><b>Ancient Egypt</b></p> <p>Levers &amp; Linkages: Moving pictures</p>
Year 4	<p><b>Ancient Greece</b></p> <p>2D shape to a 3D product: The Greeks</p>	<p><b>Brazil</b></p> <p>Celebrating Culture and Seasonality: Street Food</p>	<p><b>The Roman Empire</b></p> <p>Simple Circuits and Switches</p>
Year 5	<p><b>Invaders and Settlers</b></p> <p>Pulleys or Gears</p>	<p><b>The Tudors</b></p> <p>Cams – Tudor scenes</p>	<p><b>Rivers</b></p> <p>Frame Structures- Bridges</p>
Year 6	<p><b>Britain at War</b></p> <p>More Complex Switches: Enemy Alarm</p>	<p><b>Early Islam</b></p> <p>Healthy &amp; Varied Diets: Asian food</p>	<p><b>Across The Atlantic</b></p> <p>Combining Different fabric shapes: Bags</p>

Topic: Toys: Freestanding Structures box for a toy		Term: Autumn	Year: 1
<b>Foundations of previous learning:</b> Experience of using construction kits to build walls, towers and frameworks. <ul style="list-style-type: none"> <li>• Experience of using of basic tools e.g. scissors or hole punches with construction materials e.g. plastic, card.</li> <li>• Experience of different methods of joining card and paper.</li> </ul>			
Unit Learning			
Objective - Coverage	Skills	Knowledge	Vocabulary
<b>Designing</b> <ul style="list-style-type: none"> <li>• Generate ideas based on simple design criteria and their own experiences, explaining what they could make.</li> <li>• Develop, model and communicate their ideas through talking, mock-ups and drawings.</li> </ul> <b>Making</b> <ul style="list-style-type: none"> <li>• Plan by suggesting what to do next.</li> <li>• Select and use tools, skills and techniques, explaining their choices.</li> <li>• Select new and reclaimed materials and construction kits to build their structures.</li> <li>• Use simple finishing techniques suitable for the structure they are creating.</li> </ul> <b>Evaluating</b> <ul style="list-style-type: none"> <li>• Explore a range of existing freestanding structures in the school and local environment e.g. everyday products and buildings.</li> <li>• Evaluate their product by discussing how well it works in relation to the purpose, the user and whether it meets the original design criteria.</li> </ul> <b>Technical knowledge and understanding</b> <ul style="list-style-type: none"> <li>• Know how to make freestanding structures stronger, stiffer and more stable.</li> <li>• Know and use technical vocabulary relevant to the project.</li> </ul>	Choose appropriate materials for the design.  Use equipment appropriately and safely.  Measure, mark out, cut, shape and join materials.  Join materials effectively. Create a plan.  Make a toy using cutting & sticking techniques.  Position bricks and others construction materials to best effect.	Know how to make freestanding structures stronger, stiffer and more stable.  Know how to join materials effectively so they are strong and secure.  Know how to finish product off to look neater.  Know and use technical vocabulary relevant to the project.	cut, fold, join, fix structure, wall, tower, framework, weak, strong, base, top, underneath, side, edge, surface, thinner, thicker, corner, point, straight, curved metal, wood, plastic  circle, triangle, square, rectangle, cuboid, cube, cylinder  design, make, evaluate, user, purpose, ideas, design criteria, product, function
	Assessment of Skills	Assessment of Knowledge	
	I can design a robot with the right material. I can make a robot with the correct parts (head, body, arms and legs). I can make the robot stand up. I can use equipment correctly and safely to help make the box. I can create a plan and follow it to make the box.	<b>Explain what you made and why.</b> A robot to play with. <b>What materials did you use?</b> Boxes, tubes and masking tape. <b>What equipment did you use?</b> Scissors and glue <b>What did you find difficult about making your toy box?</b> Children might say; cutting, folding, measuring etc.	Hard Soft Cuddly Shiny Wood Metal Fabric Large Small Pull along Wind up Joining Glue Tape String Design Decorate Evaluate Stiff Stable Shaping

SCHOOL

	<b>Topic: People who help us: Making a Sandwich</b>		<b>Term: Spring</b>	<b>Year: 1</b>
<b>Foundations of previous learning:</b>				
<ul style="list-style-type: none"> <li>• Experience of common fruit and vegetables, undertaking sensory activities i.e. appearance taste and smell.</li> <li>• Experience of cutting soft fruit and vegetables using appropriate utensils.</li> </ul>				
<b>Unit Learning</b>				
<b>NC Objective - Coverage</b>	<b>Skills</b>	<b>Knowledge</b>	<b>Vocabulary</b>	
<p><b>Designing</b></p> <ul style="list-style-type: none"> <li>• Design appealing products for a particular user based on simple design criteria.</li> <li>• Generate initial ideas and design criteria through investigating a variety of fruit and vegetables.</li> <li>• Communicate these ideas through talk and drawings.</li> </ul> <p><b>Making</b></p> <p>Use simple utensils and equipment to e.g. peel, cut, slice, squeeze, grate and chop safely.</p> <ul style="list-style-type: none"> <li>• Select from a range of fruit and vegetables according to their characteristics e.g. colour, texture and taste to create a chosen product.</li> </ul> <p><b>Evaluating</b></p> <ul style="list-style-type: none"> <li>• Taste and evaluate a range of fruit and vegetables to determine the intended user's preferences.</li> <li>• Evaluate ideas and finished products against design criteria, including intended user and purpose.</li> </ul> <p><b>Technical knowledge and understanding</b></p> <ul style="list-style-type: none"> <li>• Understand where a range of fruit and vegetables come from e.g. farmed or grown at home.</li> <li>• Understand and use basic principles of a healthy and varied diet to prepare dishes, including how fruit and vegetables are part of <i>The Eatwell plate</i>.</li> <li>• Know and use technical and sensory vocabulary relevant to the project.</li> </ul>	<p>Use simple utensils and equipment to e.g. peel, cut, slice, squeeze, grate and chop safely.</p> <ul style="list-style-type: none"> <li>• Select from a range of fruit and vegetables according to their characteristics e.g. colour, texture and taste to create a chosen product.</li> </ul>	<p>Understand where a range of fruit and vegetables come from e.g. farmed or grown at home.</p> <p>Understand and use basic principles of a healthy and varied diet to prepare dishes, including how fruit and vegetables are part of <i>The Eatwell plate</i>.</p> <p>Know essential to follow food hygiene practices when handling food.</p> <p>Know what order to carry out tasks.</p> <p>Know that some people can't eat certain foods and it is important to be aware of this. Know and use technical and sensory vocabulary relevant to the project.</p>	<p>fruit and vegetable names, names of equipment and utensils</p> <p>sensory vocabulary e.g. soft, juicy, crunchy, sweet, sticky, smooth, sharp, crisp, sour, hard</p> <p>flesh, skin, seed, pip, core, slicing, peeling,</p> <p>cutting, squeezing, healthy diet, choosing, ingredients, planning, investigating tasting, arranging, popular, design, evaluate, criteria</p>	
	<b>Assessment of Skills</b>	<b>Assessment of Knowledge</b>		
	<p>I can use utensils to help prepare and make food. Such as; knife, grater, juicer, peeler.</p> <p>I can select a piece of food according to their characteristic.</p>	<p><b>What do we need to do to be hygienic when preparing and making food?</b> Wash our hands, wear an apron, use clean utensils and equipment, keep the area clean.</p> <p><b>What equipment should we use to peel a carrot?</b> A peeler.</p> <p><b>How do you make a sandwich?</b> Choose your filling, put two slices of bread on a chopping board, spread butter on the bread, add your filling to one slice of bread, put the other slice of bread on top and cut the sandwich in half.</p> <p><b>How can you describe broccoli?</b> Soft, crunchy (stem), smooth.</p>		

		Topic: In the Park: Sliders and lever- Moving Pictures	Term: Summer	Year: 1
<b>Foundations of previous learning:</b> Early experiences of working with paper and card to make simple flaps and hinges. <ul style="list-style-type: none"> <li>• Experience of simple cutting, shaping and joining skills using scissors, glue, paper fasteners and masking tape.</li> </ul>				
Unit Learning				
NC Objective - Coverage	Skills	Knowledge	Vocabulary	
<b>Designing</b> <ul style="list-style-type: none"> <li>• Generate ideas based on simple design criteria and their own experiences, explaining what they could make.</li> <li>• Develop, model and communicate their ideas through drawings and mock-ups with card and paper.</li> </ul> <b>Making</b> <ul style="list-style-type: none"> <li>• Plan by suggesting what to do next.</li> <li>• Select and use tools, explaining their choices, to cut, shape and join paper and card.</li> <li>• Use simple finishing techniques suitable for the product they are creating.</li> </ul> <b>Evaluating</b> <ul style="list-style-type: none"> <li>• Explore a range of existing books and everyday products that use simple sliders and levers.</li> <li>• Evaluate their product by discussing how well it works in relation to the purpose and the user and whether it meets design criteria.</li> </ul>	To be able to design and create a mock-up. To be able to experiment with levers and sliders. To be able to cut, shape and join paper and card. To use simple finishing techniques.	<ul style="list-style-type: none"> <li>• Explore objects which use sliders and levers e.g. collection of books and everyday products that have moving parts.</li> <li>• Understand that different mechanisms produce different types of movement.</li> <li>• Know and use technical vocabulary relevant to the project.</li> </ul> Introduce and develop vocabulary.	slider, lever, pivot, slot, bridge/guide card, masking tape, paper fastener, join pull, push, up, down, straight, curve, forwards, backwards design, make, evaluate, user, purpose, ideas, design criteria, product, function	
	Assessment of Skills	Assessment of Knowledge		
	I can design a lever and make a mock-up for a book. I can cut, shapes and join paper and card. I can use a simple finishing technique in my work	<b>What is a lever / pulley?</b> Lever – a bar that moves around a point. Pulley – a wheel with a rope or chain to lift something up. <b>Can you tell me which objects might use levers and pulleys?</b> Lever – scissors, seesaw Pulley – lifts, blinds <b>Who is the audience for a moving picture book? Why?</b> Younger children because they will think they are fun to use.		

	<b>Topic: Transport: Freestanding Structures – Making a chair</b>	<b>Term: Autumn</b>	<b>Year: 2</b>
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**Foundations of previous learning:**

- Experience of using construction kits to build walls, towers and frameworks.
- Experience of using of basic tools e.g. scissors or hole punches with construction materials e.g. plastic, card.
- Experience of different methods of joining card and paper.

**Unit Learning**

<b>NC Objective - Coverage</b>	<b>Skills</b>	<b>Knowledge</b>	<b>Vocabulary</b>
<p><b>Designing</b></p> <ul style="list-style-type: none"> <li>• Generate ideas based on simple design criteria and their own experiences, explaining what they could make.</li> <li>• Develop, model and communicate their ideas through talking, mock-ups and drawings.</li> </ul> <p><b>Making</b></p> <ul style="list-style-type: none"> <li>• Plan by suggesting what to do next.</li> <li>• Select and use tools, skills and techniques, explaining their choices.</li> <li>• Select new and reclaimed materials and construction kits to build their structures.</li> <li>• Use simple finishing techniques suitable for the structure they are creating.</li> </ul> <p><b>Evaluating</b></p> <ul style="list-style-type: none"> <li>• Explore a range of existing freestanding structures in the school and local environment e.g. everyday products and buildings.</li> <li>• Evaluate their product by discussing how well it works in relation to the purpose, the user and whether it meets the original design criteria.</li> </ul>	<p>Manipulate a variety of construction kits to create models.</p> <p>Measure and cut different materials to size.</p> <p>Create a plan.</p> <p>Select appropriate materials.</p> <p>Know how to join materials to ensure strength and stability.</p> <p>Fold materials in different ways to create strength and stability.</p>	<p>Know what a structure is and what elements make it strong and stable.</p> <p>Know which materials make a strong structure.</p> <p>Know how to make freestanding structures stronger, stiffer and more stable.</p> <p>Know and use technical vocabulary relevant to the project.</p>	<p>cut, fold, join, fix</p> <p>structure, wall, tower, framework, weak, strong, base, top, underneath, side, edge, surface, thinner, thicker, corner, point, straight, curved</p> <p>metal, wood, plastic</p> <p>circle, triangle, square, rectangle, cuboid, cube, cylinder</p> <p>design, make, evaluate, user, purpose, ideas, design criteria, product, function</p>
		<p><b>Assessment of Skills</b></p> <p>Attach different components together to make a model.</p> <p>Pieces fit together well and are the correct size.</p> <p>Can fold materials to make them stronger and more stable.</p> <p>Select the correct product to fix components together.</p>	<p><b>Assessment of Knowledge</b></p> <p><b>Give examples of structures.</b> Bridge, building, electricity pylon, furniture.</p> <p><b>Identify materials to make a structure.</b> Metal, wood and plastic.</p> <p><b>How can you make a structure stronger?</b> Roll, twist, concertina, layer, reinforcing.</p>

SCHOOL

	Topic: Dirty Beasts: Textiles - Making a wash bag		Term: Spring	Year: 2
<b>Foundations of previous learning:</b> <ul style="list-style-type: none"> <li>• Explored and used different fabrics.</li> <li>• Cut and joined fabrics with simple techniques.</li> <li>• Thought about the user and purpose of products.</li> </ul>				
<b>Unit Learning</b>				
NC Objective - Coverage	Skills	Knowledge	Vocabulary	
<b>Designing</b> <ul style="list-style-type: none"> <li>• Design a functional and appealing product for a chosen user and purpose based on simple design criteria.</li> <li>• Generate, develop, model and communicate their ideas as appropriate through talking, drawing, templates, mock-ups and information and communication technology.</li> </ul> <b>Making</b> <ul style="list-style-type: none"> <li>• Select from and use a range of tools and equipment to perform practical tasks such as marking out, cutting, joining and finishing.</li> <li>• Select from and use textiles according to their characteristics.</li> </ul> <b>Evaluating</b> <ul style="list-style-type: none"> <li>• Explore and evaluate a range of existing textile products relevant to the project being undertaken.</li> <li>• Evaluate their ideas throughout and their final products against original design criteria.</li> </ul>	Use a simple pattern.  Pin, or tape template to the material.  Measure and cut materials to size.  Thread a needle.  Join fabric using running stitch, stapling, lacing or gluing.  Use finishing techniques to improve product.	<ul style="list-style-type: none"> <li>• Understand how simple 3-D textile products are made, using a template to create two identical shapes.</li> <li>• Understand how to join fabrics using different techniques e.g. running stitch, glue, over stitch, stapling.</li> <li>• Explore different finishing techniques e.g. using painting, fabric crayons, stitching, sequins, buttons and ribbons.</li> <li>• Know and use technical vocabulary relevant to the project.</li> </ul>	names of existing products, joining and finishing techniques, tools, fabrics and components   template, pattern pieces, mark out, join, decorate, finish   features, suitable, quality mock-up, design brief, design criteria, make, evaluate, user, purpose, function	
	Assessment of Skills	Assessment of Knowledge		
	Fabric is cut effectively. Pieces fit together well and are the correct size. Can thread a needle. Can demonstrate running stitch or other effective means of fixing fabric together. Can demonstrate an example of a finishing technique.	<b>Can you identify different fabrics and their properties such as silk, wool, cotton?</b> Words such as soft, smooth, thin, opaque <b>What would you use different materials for?</b> This would depend upon the materials observed but for example: make clothes, make bedding. <b>How did you make you make your wash bag?</b> This is individual to each child and the process they follow.		

Topic: The Seaside: Wheels and Axles – making a vehicle		Term: Summer	Year: 2
<b>Foundations of previous learning:</b> Assembled vehicles with moving wheels using construction kits. <ul style="list-style-type: none"> <li>• Explore moving vehicles through play.</li> <li>• Gained some experience of designing, making and evaluating products for a specified user and purpose.</li> <li>• Developed some cutting, joining and finishing skills with card.</li> </ul>			
<b>Unit Learning</b>			
NC Objective - Coverage	Skills	Knowledge	Vocabulary
<b>Designing</b> <ul style="list-style-type: none"> <li>• Generate initial ideas and simple design criteria through talking and using own experiences.</li> <li>• Develop and communicate ideas through drawings and mock-ups.</li> </ul> <b>Making</b> <ul style="list-style-type: none"> <li>• Select from and use a range of tools and equipment to perform practical tasks such as cutting and joining to allow movement and finishing.</li> <li>• Select from and use a range of materials and components such as paper, card, plastic and wood according to their characteristics.</li> </ul> <b>Evaluating</b> <ul style="list-style-type: none"> <li>• Explore and evaluate a range of products with wheels and axles.</li> <li>• Evaluate their ideas throughout and their products against original criteria.</li> </ul>	Fix components together correctly.  Measure axle to fit the chassis.  Explores use of different axle holders in order to select preferred choice.  Create a detailed, labelled plan.  Cut dowel using a saw.	<ul style="list-style-type: none"> <li>• Explore and use wheels, axles and axle holders.</li> <li>• Distinguish between fixed and freely moving axles.</li> <li>• Know and use technical vocabulary relevant to the project.</li> </ul>	vehicle, wheel, axle  axle holder, chassis  body, cab  assembling, cutting, joining, shaping, finishing, fixed, free, moving, mechanism  names of tools, equipment and materials used  design, make, evaluate, purpose, user, criteria, functional
	<b>Assessment of Skills</b>	<b>Assessment of Knowledge</b>	<b>What do fixed and free moving axles do?</b> Fixed axles – the wheels are attached and turn with the axle Free Moving – the wheel turns on it’s own as the axle rotates/turns <b>Where would you find them?</b> Bike, Scooter Ferris wheel Roller skates Toy car Children will not be expected to name all of the above <b>How did you make your vehicle?</b> Children will explain, in their own words, the process they carried out to make their vehicle.



	<b>Topic: Stone Age / Darlington: Shell Structures</b>	<b>Term: Autumn</b>	<b>Year: 3</b>
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**Foundations of previous learning:**  
 Experience of using different joining, cutting and finishing techniques with paper and card.

- A basic understanding of 2-D and 3-D shapes in mathematics and the physical properties and everyday uses of materials in science.
- Familiarity with general purpose software that can be used to draw accurate shapes, such as Microsoft Word, or simple computer-aided design (CAD), such as 2D Primary by Techsoft.

**Unit Learning**

<b>NC Objective - Coverage</b>	<b>Skills</b>	<b>Knowledge</b>	<b>Vocabulary</b>
<p><b>Designing</b></p> <ul style="list-style-type: none"> <li>• Generate realistic ideas and design criteria collaboratively through discussion, focusing on the needs of the user and the functional and aesthetic purposes of the product.</li> <li>• Develop ideas through the analysis of existing shell structures and use computer-aided design to model and communicate ideas.</li> </ul> <p><b>Making</b></p> <ul style="list-style-type: none"> <li>• Plan the order of the main stages of making.</li> <li>• Select and use appropriate tools and software to measure, mark out, cut, score, shape and assemble with some accuracy.</li> <li>• Explain their choice of materials according to functional properties and aesthetic qualities.</li> <li>• Use computer-generated finishing techniques suitable for the product they are creating.</li> </ul> <p><b>Evaluating</b></p> <ul style="list-style-type: none"> <li>• Investigate and evaluate a range of shell structures including the materials, components and techniques that have been used.</li> <li>• Test and evaluate their own products against design criteria and the intended user and purpose.</li> </ul>	<p>Can generate ideas and design relevant to intended user.</p> <p>Can develop ideas through analysis of existing shell structures and use computer-aided design to model and communicate ideas.</p> <p>Can plan the order of the main stages of making.            Can select and use appropriate tools and software to measure mark out, cut, score shape and assemble with some accuracy.</p> <p>Can explain their choice of materials according to functional properties and aesthetic qualities.            Can use computer generated finishing techniques suitable for the product they are creating.            Can investigate and evaluate a range of shell structures including the materials, components and techniques that have been used.            Can test and evaluate the product by whether it meets the design criteria and the intended user and purpose.</p>	<ul style="list-style-type: none"> <li>• Develop and use knowledge of nets of cubes and cuboids and, where appropriate, more complex 3D shapes.</li> <li>• Develop and use knowledge of how to construct strong, stiff shell structures.</li> <li>• Know and use technical vocabulary relevant to the project.</li> </ul>	<p>shell structure,            three-dimensional (3-D) shape, net,            cube, cuboid, prism, vertex, edge, face, length, width, breadth, capacity            marking out, scoring, shaping, tabs, adhesives, joining, assemble, accuracy, material, stiff, strong, reduce, reuse, recycle, corrugating, ribbing, laminating            font, lettering, text, graphics, decision, evaluating,            design brief design criteria, innovative, prototype</p>
	<b>Assessment of Skills</b>	<b>Assessment of Knowledge</b>	
	<p>Can develop ideas through analysis of existing shell structures and use computer-aided design to model and communicate ideas.            Can select and use appropriate tools and software to measure mark out, cut, score shape and assemble with some accuracy.            Can test and evaluate the product by whether it meets the design criteria and the intended user and purpose.</p>	<p><b>How do we construct strong, stiff shell structures?</b>            Strong foundations, wide and thick at the bottom            Strong shapes (triangles) –bridges            Stack materials not directly on top of each other</p>	

Topic: The Rainforest: Moving Animals

Term: Spring

Year: 3

**Foundations of previous learning:**

Explored simple mechanisms, such as sliders and levers, and simple structures.

- Learnt how materials can be joined to allow movement.
- Joined and combined materials using simple tools and techniques.

**Unit Learning**

NC Objective - Coverage	Skills	Knowledge	Vocabulary
<p><b>Designing</b></p> <ul style="list-style-type: none"> <li>• Generate realistic and appropriate ideas and their own design criteria through discussion, focusing on the needs of the user.</li> <li>• Use annotated sketches and prototypes to develop, model and communicate ideas.</li> </ul> <p><b>Making</b></p> <ul style="list-style-type: none"> <li>• Order the main stages of making.</li> <li>• Select from and use appropriate tools with some accuracy to cut and join materials and components such as tubing, syringes and balloons.</li> <li>• Select from and use finishing techniques suitable for the product they are creating.</li> </ul> <p><b>Evaluating</b></p> <ul style="list-style-type: none"> <li>• Investigate and analyse books, videos and products with pneumatic mechanisms.</li> <li>• Evaluate their own products and ideas against criteria and user needs, as they design and make.</li> </ul>	<p>Can use annotated sketches and prototypes to develop model and communicate ideas.</p> <p>Can order the main stages of making.</p> <p>Can select and use appropriate tools with some accuracy to cut and join materials and components such as tubing, syringes and balloons.</p> <p>Can select from and use finishing techniques suitable for the product they are creating.</p> <p>Can investigate and analyse books, videos and products with pneumatic mechanisms.</p> <p>Can evaluate their own products and ideas against criteria and user needs, as they design and make.</p>	<p>Understand and use pneumatic mechanisms.</p> <p>Know and use technical vocabulary relevant to the project.</p> <p><b>Designer: James Dyson</b></p>	<p>Components, fixing, attaching, tubing, syringe, plunger, split pin, paper fastener</p> <p>pneumatic system, input movement, process, output movement, control, compression, pressure, inflate, deflate, pump, seal, air-tight</p> <p>linear, rotary, oscillating, reciprocating</p> <p>user, purpose, function, prototype, design criteria, innovative, appealing, design brief, research, evaluate, ideas, constraints, investigate</p>
	<b>Assessment of Skills</b>	<b>Assessment of Knowledge</b>	
	<p>Can use annotated sketches and prototypes to develop model and communicate ideas.</p> <p>Can select and use appropriate tools with some accuracy to cut and join materials and components such as tubing, syringes and balloons.</p> <p>Can evaluate their own products and ideas against criteria and user needs, as they design and make.</p>	<p><b>What is a pneumatic mechanism?</b></p> <p>Use air pressure to move cylinders to make the toy move. Air pressure in a pneumatic system acts like a spring to, storing energy until it is released.</p>	

		Topic: Ancient Egypt: Levers & Linkages	Term: Summer	Year: 3
<b>Foundations of previous learning:</b> <ul style="list-style-type: none"> <li>• Explored and used mechanisms such as flaps, sliders and levers.</li> <li>• Gained experience of basic cutting, joining and finishing techniques with paper and card.</li> </ul>				
<b>Unit Learning</b>				
NC Objective - Coverage	Skills	Knowledge	Vocabulary	
<b>Designing</b> <ul style="list-style-type: none"> <li>• Generate realistic ideas and their own design criteria through discussion, focusing on the needs of the user.</li> <li>• Use annotated sketches and prototypes to develop, model and communicate ideas.</li> </ul> <b>Making</b> <ul style="list-style-type: none"> <li>• Order the main stages of making.</li> <li>• Select from and use appropriate tools with some accuracy to cut, shape and join paper and card.</li> <li>• Select from and use finishing techniques suitable for the product they are creating.</li> </ul> <b>Evaluating</b> <ul style="list-style-type: none"> <li>• Investigate and analyse books and, where available, other products with lever and linkage mechanisms.</li> <li>• Evaluate their own products and ideas against criteria and user needs, as they design and make.</li> </ul>	Identify: the lever and the linkage, input and output, fixed pivot and loose pivot.  Can use annotated sketches and prototypes to develop model and communicate ideas.  Can order the main stages of making. Can select from and use appropriate tools with some accuracy to cut, shape and join paper and card. Can select from and use finishing techniques suitable for the product they are creating. Can investigate and analyse books and where available, other products with lever and linkage mechanisms. Can evaluate their own products and ideas against criteria and user needs as they design and make.	Understand and use lever and linkage mechanisms. <ul style="list-style-type: none"> <li>• Distinguish between fixed and loose pivots.</li> <li>• Know and use technical vocabulary relevant to the project.</li> </ul>	mechanism, lever, linkage, pivot, slot, bridge, guide  system, input, process, output  linear, rotary, oscillating, reciprocating  user, purpose, function  prototype, design criteria, innovative, appealing, design brief	
		<b>Assessment of Skills</b>	<b>Assessment of Knowledge</b>	
	Can use annotated sketches and prototypes to develop model and communicate ideas. Can select from and use appropriate tools with some accuracy to cut, shape and join paper and card. Can evaluate their own products and ideas against criteria and user needs, as they design and make.	<b>Understand and use lever and linkage mechanisms</b> In a lever and linkage mechanism, the 'input movement' is where the user pushes or pulls a card strip. The 'output movement' is where one or more parts of the picture move. When you push the card strip (input movement), the two levers move (output movement). <b>Distinguish between fixed and loose pivots.</b> Loose pivot - a paper fastener that joins card <b>Know and use technical vocabulary relevant to the project.</b> Linkage, pivot, lever, mechanism, input, output, fixed, fastener, slot, bridge, guide, system, rotary.		

SCHOOL

Topic: Ancient Greece: Making a cushion		Term: Autumn	Year: 4	
<b>Foundations of previous learning:</b> Have joined fabric in simple ways by gluing and stitching. Have used simple patterns and templates for marking out. Have evaluated a range of textile products.				
Unit Learning				
NC Objective - Coverage	Skills	Knowledge	Vocabulary	
<b>Designing</b> <ul style="list-style-type: none"> <li>• Generate realistic ideas through discussion and design criteria for an appealing, functional product fit for purpose and specific user/s.</li> <li>• Produce annotated sketches, prototypes, final product sketches and pattern pieces.</li> </ul> <b>Making</b> <ul style="list-style-type: none"> <li>• Plan the main stages of making.</li> <li>• Select and use a range of appropriate tools with some accuracy e.g. cutting, joining and finishing.</li> <li>• Select fabrics and fastenings according to their functional characteristics e.g. strength, and aesthetic qualities e.g. pattern.</li> </ul> <b>Evaluating</b> <ul style="list-style-type: none"> <li>• Investigate a range of 3-D textile products relevant to the project.</li> <li>• Test their product against the original design criteria and with the intended user.</li> <li>• Take into account others' views.</li> <li>• Understand how a key event/individual has influenced the development of the chosen product and/or fabric.</li> </ul>	Can generate realistic ideas and design criteria fit for user.  Can produce annotated sketches, prototypes, final product sketches and pattern pieces:  Can plan the main stages of making.  Can select and use a range of appropriate tools with some accuracy e.g. cutting, joining and finishing.  Can select fabrics and fastenings according to their functional characteristics e.g. strength, and aesthetic qualities e.g. pattern.  Can investigate a range of 3-D textile products relevant to the project.  Can test the product against the original design criteria and the intended user  Can take into account others' views.  Can understand how key event/individual has influenced the development of the chosen product and/or fabric.	Know which fabrics are suitable for the product. Know how to strengthen, stiffen and reinforce existing fabrics. Understand how to securely join two pieces of fabric together. Know which technique makes the strongest seam. Understand the need for patterns and seam allowances. Plan the main stages of making e.g. using a flowchart or storyboard. Know how to assemble effectively using good finishing techniques. <ul style="list-style-type: none"> <li>• Know and use technical vocabulary relevant to the project.</li> </ul> <b>Designer: Terence Conran</b> History of cushions as being a symbol of wealth, now very fashionable and use of cushions outside become more prevalent.	fabric, names of fabrics, fastening, compartment, zip, button, structure, finishing technique, strength, weakness, stiffening, templates, stitch, seam, seam allowance   user, purpose, design, model, evaluate, prototype, annotated sketch, functional, innovative, investigate, label, drawing, aesthetics, function, pattern pieces	
		Assessment of Skills	Assessment of Knowledge	
		Can produce a sketch design and final product sketches and pattern pieces. Can select and use a range of appropriate tools with some accuracy e.g. cutting, joining and finishing. Can select fabrics and fastenings according to their functional characteristics e.g. strength, and aesthetic qualities e.g. pattern.	<b>Can you name types of stitches?</b> Running stitch, basting stitch, backstitch, invisible stitch, slip stitch, hemming stitch, overcast stitch, cast stitch. <b>What would be a suitable material to make a cushion?</b> Cotton and linen mix fabrics. <b>What equipment would you need to complete a cushion?</b> Fabric, fastening (zip, button), needle, thread, scissors, tape measure, fabric pins, pillow stuffing.	

		Topic: Brazil: Celebrating Culture and Seasonality: Street Food	Term: Spring	Year: 4	
<b>Foundations of previous learning:</b>					
Know some ways to prepare ingredients safely and hygienically. Have some basic knowledge and understanding about healthy eating and <i>The Eatwell Plate</i> .					
<ul style="list-style-type: none"> <li>Have used some equipment and utensils and prepared and combined ingredients to make a product.</li> </ul>					
Unit Learning					
NC Objective - Coverage	Skills	Knowledge	Vocabulary		
<p><b>Designing</b></p> <ul style="list-style-type: none"> <li>Generate and clarify ideas through discussion with peers and adults to develop design criteria including appearance, taste, texture and aroma for an appealing product for a particular user and purpose.</li> <li>Use annotated sketches and appropriate information and communication technology, such as web-based recipes, to develop and communicate ideas.</li> </ul> <p><b>Making</b></p> <ul style="list-style-type: none"> <li>Plan the main stages of a recipe, listing ingredients, utensils and equipment.</li> <li>Select and use appropriate utensils and equipment to prepare and combine ingredients.</li> <li>Select from a range of ingredients to make appropriate food products, thinking about sensory characteristics.</li> </ul> <p><b>Evaluating</b></p> <ul style="list-style-type: none"> <li>Carry out sensory evaluations of a variety of ingredients and products. Record the evaluations using e.g. tables and simple graphs.</li> <li>Evaluate the ongoing work and the final product with reference to the design criteria and the views of others.</li> </ul>	<p>Can generate and clarify ideas through discussion with peers and adults to develop design criteria including appearance, taste, texture and aroma for an appealing product for a particular user and purpose.</p> <p>Can use annotated sketches and appropriate information and communication technology, such as web based recipes, to develop and communicate ideas.</p> <p>Can use correct vocabulary to show understanding: Utensils, hygienic, edible, processed, seasonal, harvested, savoury, moist, greasy, annotated sketch.</p> <p>Can order of the main stages of a recipe, listing ingredients, utensils and equipment.</p> <p>Can select and use appropriate utensils and equipment to prepare and combine ingredients.</p> <p>Can select from a range of ingredients to make appropriate food products, thinking about sensory characteristics.</p> <p>Can carry out sensory evaluations of a variety of ingredients and products. Record the evaluations using e.g. tables and simple graphs.</p> <p>Can evaluate the ongoing work and the final product with reference to the design criteria and the views of others.</p>	<p>Know how to use appropriate equipment and utensils to prepare and combine food.</p> <p>Know about a range of fresh and processed ingredients appropriate for their product and whether they are grown, reared or caught.</p> <p>Know and use relevant technical and sensory vocabulary appropriately.</p> <p>Know what basic food hygiene practices should be employed when handling and preparing food.</p> <p>Know the main stages in making the food product, before preparing/cooking it, including the ingredients and utensils they will need.</p> <p>Know how to adjust seasoning to alter flavour.</p> <p>Know if safe for intended user.</p> <p>Know how to create an appealing product.</p> <p><b>Chef – Jamie Oliver</b></p>	<p>name of products, names of equipment, utensils, techniques and ingredients</p> <p>texture, taste, sweet, sour, hot, spicy, appearance, smell, preference, greasy, moist, cook, fresh, savoury</p> <p>hygienic, edible, grown, reared, caught, frozen, tinned, processed, seasonal, harvested healthy/varied diet</p> <p>planning, design criteria, purpose, user, annotated sketch, sensory evaluations</p>		
		Assessment of Skills	Assessment of Knowledge		
		<p>Can use annotated sketches and appropriate information and communication technology, such as web based recipes, to develop and communicate ideas.</p> <p>Can select from a range of ingredients to make appropriate food products, thinking about sensory characteristics.</p> <p>Can carry out sensory evaluations of a variety of ingredients and products. Record the evaluations using e.g. tables and simple graphs.</p>	<p><b>What ingredients do you need to make the Brazilian street food 'Pastel'?</b></p> <p>1 pound all purpose flour, 1 large egg yolk, 1 tablespoon margarine, 1 tablespoon baking powder, 2 cups milk, 1 teaspoons salt, Mozzarella cheese and Vegetable oil.</p> <p><b>What foods derive from Spain?</b></p> <p>Paella, tapas, churros, tortilla, gazpacho, patatas bravas</p> <p><b>What food are produced in Britain?</b></p> <p>Wheat, oats, barley, potatoes, lettuce, milk, carrots, chicken, beef.</p>		

		Topic: The Roman Empire: Simple Circuits and Switches	Term: Summer	Year: 4	
<b>Foundations of previous learning:</b> <ul style="list-style-type: none"> <li>Constructed a simple series electrical circuit in science using bulbs, switches and buzzers.</li> <li>Cut and joined a variety of construction materials such as wood, card, plastic reclaimed materials and glue.</li> </ul>					
<b>Unit Learning</b>					
NC Objective - Coverage	Skills	Knowledge	Vocabulary		
<b>Designing</b> <ul style="list-style-type: none"> <li>Gather information about needs and wants, and develop design criteria to inform the design of products that are fit for purpose, aimed at particular individuals or groups.</li> <li>Generate, develop, model and communicate realistic ideas through discussion and, as appropriate, annotated sketches, cross-sectional and exploded diagrams.</li> </ul> <b>Making</b> <ul style="list-style-type: none"> <li>Order the main stages of making.</li> <li>Select from and use tools and equipment to cut, shape, join and finish with some accuracy.</li> <li>Select from and use materials and components, including construction materials and electrical components according to their functional properties and aesthetic qualities.</li> </ul> <b>Evaluating</b> <ul style="list-style-type: none"> <li>Investigate and analyse a range of existing battery-powered products.</li> <li>Evaluate their ideas and products against their own design criteria and identify the strengths and areas for improvement in their work.</li> </ul>	Can gather information about the needs and wants and develop design criteria to inform the design of products that are fit for purpose, aimed at particular individuals or groups. Can generate, develop, model and communicate realistic ideas through discussion and as appropriate, annotated sketches, cross-sectional and exploded diagrams. Can use correct vocabulary to show understanding: Series circuit, fault, connection, toggle switch, push to make switch, push to break switch, battery, insulator, conductor. Can order of the main stages of making. Can select from and use appropriate tools and equipment to cut, shape, join and finish with accuracy. Can select from and use materials and components according to their functional properties and aesthetic qualities. Can investigate and analyse a range of existing battery powered products. Can evaluate their own ideas and products against their own design criteria and identify the strengths and areas for improvement in their work	Know how to make manually controlled simple series circuits with batteries and different types of switches, bulbs and buzzers. Know which components are input and which are input devices: switch and which are output devices: bulb, buzzer. Know how to find a fault in a circuit. Know how to make a variety of switches which operate in different ways. Know how to avoid make short circuits. Record ideas using annotated sketches, cross-sectional and exploded diagrams. Know the main stages in making and testing.	Series circuit, fault, connection, toggle switch, push-to-make switch, push-to-break switch, battery, battery holder, bulb, bulb holder, wire, insulator, conductor, crocodile clip. Control, program, system, input device, output device. User, purpose, function, prototype, design criteria, innovative, appealing, design brief.		
	<b>Assessment of Skills</b>		<b>Assessment of Knowledge</b>		
	Can generate, develop, model and communicate realistic ideas through discussion and as appropriate, annotated sketches, cross-sectional and exploded diagrams. Can select from and use appropriate tools and equipment to cut, shape, join and finish with accuracy. Can investigate and analyse a range of existing battery powered products.		<b>What equipment would you need to make a bulb light?</b> Wires, switch, bulb, battery <b>How would you secure it in to the object?</b> Paper clips, tape, battery holder, split pin		

**Foundations of previous learning:**

- Experience of axles, axle holders and wheels that are fixed or free moving.
- Basic understanding of electrical circuits, simple switches and components.
- Experience of cutting and joining techniques with a range of materials including card, plastic and wood.
- An understanding of how to strengthen and stiffen structures.

**Unit Learning**

NC Objective - Coverage	Skills	Knowledge	Vocabulary
<p><b>Designing</b></p> <ul style="list-style-type: none"> <li>• Generate innovative ideas by carrying out research using surveys, interviews, questionnaires and web-based resources.</li> <li>• Develop a simple design specification to guide their thinking.</li> <li>• Develop and communicate ideas through discussion, annotated drawings, exploded drawings and drawings from different views.</li> </ul> <p><b>Making</b></p> <ul style="list-style-type: none"> <li>• Produce detailed lists of tools, equipment and materials. Formulate step-by-step plans and, if appropriate, allocate tasks within a team.</li> <li>• Select from and use a range of tools and equipment to make products that are accurately assembled and well finished. Work within the constraints of time, resources and cost.</li> </ul> <p><b>Evaluating</b></p> <ul style="list-style-type: none"> <li>• Compare the final product to the original design specification.</li> <li>• Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose.</li> <li>• Consider the views of others to improve their work.</li> <li>• Investigate famous manufacturing and engineering companies relevant to the project.</li> </ul>	<p>Can generate innovative ideas by carrying out research using surveys, interviews, questionnaires and web based resources.</p> <p>Can develop a simple design specification to guide their thinking, communicate ideas through discussion and drawings.</p> <p>Can use correct vocabulary to show understanding: Pulley drive belt, gear, rotation, spindle, driver, follower, ratio, transmit, axle, motor</p> <p>Can produce detailed lists of tools, equipment and materials. Formulate step-by-step plans and, if appropriate, allocate tasks within a team.</p> <p>Can select and use a range of tools and equipment to make products that are accurately assembled and well finished.</p> <p>Can compare the final product to the original design specification.</p> <p>Can test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose.</p> <p>Can consider the views of others to improve their work.</p> <p>Can investigate famous manufacturing and engineering companies relevant to the project.</p>	<p>Know how gears and pulleys can be used to speed up, slow down or change the direction of movement. (Explore through FT)</p> <ul style="list-style-type: none"> <li>• Communicate ideas through detailed, annotated drawings from different views and/or exploded diagrams. The drawings should indicate the design decisions made, including the location of the mechanical and electrical components, how they work as a system with an input, process and output, and the appearance and finishing techniques for the product.</li> <li>• Produce detailed step-by-step plans and lists tools, equipment and materials needed.</li> </ul>	<p>pulley, drive belt, gear, rotation, spindle, driver, follower, ratio, transmit, axle, motor</p> <p>circuit, switch, circuit diagram</p> <p>annotated drawings, exploded diagrams</p> <p>mechanical system, electrical system, input, process, output</p>
	<p><b>Assessment of Skills</b></p>	<p><b>Assessment of Knowledge</b></p>	
	<p>Can develop a simple design specification to guide their thinking, communicate ideas through discussion and drawings.</p> <p>Can select and use a range of tools and equipment to make products that are accurately assembled and well finished.</p> <p>Can test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose.</p>	<p><b>Understand that mechanical and electrical systems have an input, process and an output.</b> Inputs in electrical systems = switch, sensors, Inputs in mechanical systems = force, fuel- energy to start the motion. Turning a handle, pushing a pedal on a bike, pulling / pressing a lever. Process – the system components work in order to create the output. Pedal system on a bike- chain, cogs. Brake system on a bike- cables, springs, callipers, brake pads. An electrical circuit- wires, battery. Output- the outcome from the process. A light turns on, a buzzer makes a noise; bike wheels turn; bike brakes stop the bike; <b>Understand how gears and pulleys can be used to speed up, slow down or change the direction of movement.</b> Gears- can make wheels turn at different speeds e.g. a bike. If the first gear wheel is smaller (and has fewer teeth) than the second one, then the second (bigger) gear doesn't have to move as quickly to keep up with the smaller gear. Pulleys are like gears but the two wheels do not lock together. Instead the wheels are joined by a belt. By changing the belt and how it is attached to the pulleys will alter the direction of the movement of the driver wheel and the follower wheel. <b>Know and use technical vocabulary relevant to the project.</b> Pulley, gear, driver, follower, rotate, rotation, teeth, ratio, drive belt, spindle, transmit, axle, motor circuit, switch, circuit diagram mechanical system, electrical system, input, process, output</p>	<p>design decisions, functionality, innovation, authentic, user, purpose, design specification, design brief</p>

**Foundations of previous learning:**

Experience of axles, axle holders and wheels that are fixed or free moving.  
 Basic understanding of different types of movement.  
 Experience of cutting and joining techniques with a range of materials.  
 An understanding of how to strengthen and stiffen structures.

**Unit Learning**

NC Objective - Coverage	Skills	Knowledge	Vocabulary
<p><b>Designing</b></p> <ul style="list-style-type: none"> <li>• Generate innovative ideas by carrying out research using surveys, interviews, questionnaires and web-based resources.</li> <li>• Develop a simple design specification to guide their thinking.</li> <li>• Develop and communicate ideas through discussion, annotated drawings, exploded drawings and drawings from different views.</li> </ul> <p><b>Making</b></p> <ul style="list-style-type: none"> <li>• Produce detailed lists of tools, equipment and materials. Formulate step-by-step plans and, if appropriate, allocate tasks within a team.</li> <li>• Select from and use a range of tools and equipment to make products that are accurately assembled and well finished. Work within the constraints of time, resources and cost.</li> </ul>	<p>Can generate innovative ideas by carrying out research using surveys, interviews, questionnaires and web based resources.          Can develop a simple design specification to guide their thinking, communicate ideas through discussion and drawings.          Can use correct vocabulary to show understanding:          Cam, snail cam, off-centre cam, peg cam, pear shaped cam, follower, axle, shaft, crank handle, housing framework          Can produce detailed lists of tools, equipment and materials.          Formulate step-by-step plans and, if appropriate, allocate tasks within a team.          Can select and use a range of tools and equipment to make products that are accurately assembled and well finished.          Can use a hand drill safely to make an off-centre cam.          Can position it accurately in a housing.          Can measure, mark, cut, shape and join using appropriate tools.          Can compare the final product to the original design specification.          Can test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose.          Can consider the views of others to improve their work.</p>	<ul style="list-style-type: none"> <li>• Understand that mechanical systems have an input, process and an output.</li> <li>• Understand how cams can be used to produce different types of movement and change the direction of movement.</li> <li>• Know and use technical vocabulary relevant to the design brief.</li> <li>• Know how to communicate ideas in a variety of ways and indicate on drawing where design decisions have been made.</li> <li>• Know how to organise step by step plan and list tools needed in the process and when.</li> </ul>	<p>Cam, snail cam, off centre cam, peg cam, pear shaped cam</p> <p>Follower, axle, shaft, crank, handle, housing, framework.</p> <p>Rotation, rotary motion, oscillating motion, reciprocating motion</p> <p>Annotated sketches, exploded diagrams</p> <p>mechanical system, input movement, process, output movement</p>
<p><b>Evaluating</b></p> <ul style="list-style-type: none"> <li>• Compare the final product to the original design specification.</li> <li>• Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose.</li> <li>• Consider the views of others to improve their work.</li> <li>• Investigate famous manufacturing and engineering companies relevant to the project.</li> </ul>	<p><b>Assessment of Skills</b></p> <p>Can produce detailed lists of tools, equipment and materials.          Formulate step-by-step plans and, if appropriate, allocate tasks within a team.</p> <p>Can investigate famous manufacturing and engineering companies relevant to the project.</p>	<p><b>Assessment of Knowledge</b></p> <p><b>Can explain the mechanical system in their work. Can explain how it was made.</b>          A cam mechanism has two main parts:</p> <ul style="list-style-type: none"> <li>• a cam - attached to a crankshaft, which rotates</li> <li>• a follower - touches the cam and follows the shape, moving up and down.</li> </ul> <p><b>Knows where Cams are used.</b>          A CAM changes the input motion, which is usually rotary motion (a rotating motion), to a reciprocating motion of the follower. They are found in many machines and toys A CAM has two parts, the FOLLOWER and the CAM PROFILE.          A cam is a rotating or sliding piece in a mechanical linkage used especially in transforming rotary motion into linear motion. It is often a part of a rotating wheel (e.g. an eccentric wheel) or shaft (e.g. a cylinder with an irregular shape) that strikes a lever at one or more points on its circular path. The cam can be a simple tooth, as is used to deliver pulses of power to a steam hammer, for example, or an eccentric disc or other shape that produces a smooth reciprocating (back and forth) motion in the follower, which is a lever making contact with the cam. A cam timer is similar, and were widely used for electric machine control (an electromechanical timer in a washing machine being a common example) before the advent of inexpensive electronics, microcontrollers, integrated circuits, programmable logic controllers and digital control.</p>	<p>design decisions, functionality, innovation, authentic, user, purpose, design specification, design brief.</p>



**Foundations of previous learning:**

Experience of using measuring, marking out, cutting, joining, shaping and finishing techniques with construction materials.

Basic understanding of what structures are and how they can be made stronger, stiffer and more stable.

**Unit Learning**

NC Objective - Coverage	Skills	Knowledge	Vocabulary
<p><b>Designing</b></p> <ul style="list-style-type: none"> <li>Carry out research into user needs and existing products, using surveys, interviews, questionnaires and web-based resources.</li> <li>Develop a simple design specification to guide the development of their ideas and products, taking account of constraints including time, resources and cost.</li> <li>Generate, develop and model innovative ideas, through discussion, prototypes and annotated sketches.</li> </ul> <p><b>Making</b></p> <ul style="list-style-type: none"> <li>Formulate a clear plan, including a step-by-step list of what needs to be done and lists of resources to be used.</li> <li>Competently select from and use appropriate tools to accurately measure, mark out, cut, shape and join construction materials to make frameworks.</li> <li>Use finishing and decorative techniques suitable for the product they are designing and making.</li> </ul> <p><b>Evaluating</b></p> <ul style="list-style-type: none"> <li>Investigate and evaluate a range of existing frame structures.</li> <li>Critically evaluate their products against their design specification, intended user and purpose, identifying strengths and areas for development, and carrying out appropriate tests.</li> <li>Research key events and individuals relevant to frame structures.</li> </ul>	<p>Can generate innovative ideas by carrying out research using surveys, interviews, questionnaires and web based resources.</p> <p>Can develop a simple design specification to guide their thinking, communicate ideas through discussion and drawings.</p> <p>Can use correct vocabulary to show understanding: Cam, snail cam, off-centre cam, peg cam, pear shaped cam, follower, axle, shaft, crank handle, housing framework</p> <p>Can produce detailed lists of tools, equipment and materials. Formulate step-by-step plans and, if appropriate, allocate tasks within a team.</p> <p>Can select and use a range of tools and equipment to make products that are accurately assembled and well finished.</p> <p>Can compare the final product to the original design specification.</p> <p>Can test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose.</p> <p>Can consider the views of others to improve their work.</p>	<p>Learn about existing bridges Transporter Bridge <b>Ferdinand Joseph Arnodin</b> (1845-1924), Skerne Bridge Darlington – Ignatius Bonomi.</p> <p>Understand how to strengthen, stiffen and reinforce 3-D frameworks.</p> <p>Know where the weak points are likely to be.</p> <p>Know and use technical vocabulary relevant to the project.</p> <p>Know how to produce a detailed, step-by-step plan, listing tools and materials.</p> <p>Sketches should be annotated with notes to help develop and communicate their ideas.</p>	<p>frame structure stiffen strengthen reinforce triangulation stability shape join temporary permanent design brief design specification prototype annotated sketch purpose user innovation research functional</p>
	<p><b>Assessment of Skills</b></p>	<p><b>Assessment of Knowledge</b></p>	
	<p>Can produce detailed lists of tools, equipment and materials. Formulate step-by-step plans and, if appropriate, allocate tasks within a team.</p> <p>Can investigate famous manufacturing and engineering companies relevant to the project.</p>	<p><b>Can you name some famous bridges and who designed them?</b></p> <p><b>Clifton suspension bridge-</b> is a suspension bridge. Designed by William Henry Barlow and John Hawkshaw, based on an earlier design by Isambard Kingdom Brunel. <b>Tyne bridge-</b> is a through arch bridge. Designed by the engineering firm Mott, Hay and Anderson and was built by Dorman Long and Co. of Middlesbrough.</p> <p><b>Humber bridge-</b> is a single-span road suspension bridge. Bernard Wex OBE (24 April 1922 – 31 July 1990) produced the design in 1964 that was actually built. <b>Heinrich Gerber-</b> The first cantilever bridge was built in 1867. He wanted to create a bridge long enough to cross larger distances, such as the Main River in Germany.</p> <p><b>Forth bridge-</b> Scotland. Cantilever bridge- (9 miles from Edinburgh) <b>Lake Pontchartrain Causeway-</b> USA. Beam bridge. (the longest bridge over water in the world) Ernest M. Loeb Jr. envisioned the project.</p> <p><b>Know some technical vocabulary.</b></p> <p>Suspension bridge, Arch bridge, Cantilever bridge. Beam bridge. Beam, Cantilever, Suspension, arch, span, decking, abutments, load, Dead load, live load, settlement load,</p> <p><b>Explain how the bridge was made and how it was strengthened?</b></p> <p>Identify how the bridge is constructed and where the main support and strength comes from- different forms of bridge that can be constructed. Beam, Cantilever, Suspension, arch, span, decking, pillars, tower, piers, compression, tension. The Tyne Bridge and Sydney Harbour Bridge are strong because they use triangles- the arch transfer the load. An arch is useful because it transfers the load instead of focusing the load on one spot.</p>	

**Foundations of previous learning:**

Understanding of the essential characteristics of a series circuit and experience of creating a battery-powered, functional, electrical product.

- Initial experience of using computer control software and an interface box or a standalone box, e.g. writing and modifying a program to make a light flash on and off.

**Unit Learning**

NC Objective - Coverage	Skills	Knowledge	Vocabulary
<p><b>Designing</b></p> <ul style="list-style-type: none"> <li>• Use research to develop a design specification for a functional product that responds automatically to changes in the environment. Take account of constraints including time, resources and cost.</li> <li>• Generate and develop innovative ideas and share and clarify these through discussion.</li> <li>• Communicate ideas through annotated sketches, pictorial representations of electrical circuits or circuit diagrams.</li> </ul> <p><b>Making</b></p> <ul style="list-style-type: none"> <li>• Formulate a step-by-step plan to guide making, listing tools, equipment, materials and components.</li> <li>• Competently select and accurately assemble materials, and securely connect electrical components to produce a reliable, functional product.</li> <li>• Create and modify a computer control program to enable an electrical product to work automatically in response to changes in the environment.</li> </ul>	<p>Can use research to develop a design specification for a functional product that responds automatically to the changes in an environment. Take account of constraints including time, resources and cost.</p> <p>Can generate and develop innovative ideas and share and clarify these through discussion, annotated drawing, and pictorial representations of electrical circuits or circuit diagrams.</p> <p>Can use correct vocabulary to show understanding: Series circuit, parallel circuit, names of switches and components, input device, output device, control, flow chart.</p> <p>Can formulate step-by-step to guide making, listing tools, equipment, materials and components.</p> <p>Can competently select and accurately assemble materials and securely connect electrical components to produce a reliable, functional product.</p> <p>Can create and modify a computer control program to enable an electrical product to work automatically in response to changes to the environment.</p> <p>Can continually evaluate and modify the working features of the product to match the initial design specification.</p> <p>Can test the system to demonstrate its effectiveness for the intended user and purpose.</p> <p>Can investigate famous inventors who developed ground-breaking electrical systems and components.</p>	<p>Understand and use electrical systems in their products.</p> <p>Apply their understanding of computing to program, monitor and control their products.</p> <p>Know and use technical vocabulary relevant to the project.</p> <p>Communicate ideas through annotated sketches, pictorial representations of electrical circuits or circuit diagrams. Drawings should indicate the design decisions made, including the location of the electrical components and how they work as a system with an input, process and output.</p> <p>Produce detailed step-by-step plans and lists of tools, equipment and materials needed. If appropriate, allocate tasks within a team.</p> <p>Make high quality products, applying knowledge, understanding and skills from IEAs and FTs. Create and modify a computer control program to enable the product to work automatically in response to changes in the environment.</p> <p>Critically evaluate throughout and the final product, comparing it to the original design specification. Test the system to demonstrate its effectiveness for the intended user and purpose.</p> <p><b>Inventor: Thomas Edison</b></p>	<p>series circuit, parallel circuit, names of switches and components, input device, output device, system, monitor, control, program, flowchart</p> <p>function, innovative, design specification, design brief, user, purpose</p>
<p><b>Evaluating</b></p> <ul style="list-style-type: none"> <li>• Continually evaluate and modify the working features of the product to match the initial design specification.</li> <li>• Test the system to demonstrate its effectiveness for the intended user and purpose.</li> <li>• Investigate famous inventors who developed ground-breaking electrical systems and components.</li> </ul>	<p><b>Assessment of Skills</b></p> <p>Can use correct vocabulary to show understanding: Series circuit, parallel circuit, names of switches and components, input device, output device, control, flowchart.</p> <p>Can select and assemble materials and securely connect electrical components to produce a functional product</p> <p>Can investigate and name famous inventors who developed electrical systems and components</p>	<p><b>Assessment of Knowledge</b></p> <p><b>What is series circuit?</b> A series circuit is a simple pathway that lets electrons flow to one or more resistors. A resistor is anything that uses power from a cell (battery).</p> <p><b>What is a parallel circuit?</b> In a parallel circuit, different components are connected on different branches of the wire. A parallel circuit contains multiple pathways, or branches.</p>	



**Foundations of previous learning:**

- Have knowledge and understanding about food hygiene, nutrition, healthy eating and a varied diet.
- Be able to use appropriate equipment and utensils, and apply a range of techniques for measuring out, preparing and combining ingredients.

**Unit Learning**

NC Objective - Coverage	Skills	Knowledge	Vocabulary
<ul style="list-style-type: none"> <li>• Generate innovative ideas through research and discussion with peers and adults to develop a design brief and criteria for a design specification.</li> <li>• Explore a range of initial ideas, and make design decisions to develop a final product linked to user and purpose.</li> <li>• Use words, annotated sketches and information and communication technology as appropriate to develop and communicate ideas.</li> </ul> <p><b>Making</b></p> <ul style="list-style-type: none"> <li>• Write a step-by-step recipe, including a list of ingredients, equipment and utensils.</li> <li>• Select and use appropriate utensils and equipment accurately to measure and combine appropriate ingredients.</li> <li>• Make, decorate and present the food product appropriately for the intended user and purpose.</li> </ul> <p><b>Evaluating</b></p> <ul style="list-style-type: none"> <li>• Carry out sensory evaluations of a range of relevant products and ingredients. Record the evaluations using e.g. tables/graphs/charts such as star diagrams.</li> <li>• Evaluate the final product with reference back to the design brief and design specification, taking into account the views of others when identifying improvements.</li> <li>• Understand how key chefs have influenced eating habits to promote varied and healthy diets.</li> </ul>	<p>Can generate innovative ideas through research and discussion with peers and adults to develop a design brief and criteria for a design specification.</p> <p>Can explore a range of ideas, make a design to develop a final product linked to user and purpose.</p> <p>Can use correct vocabulary to show understanding: Yeast, dough, unleavened, baking soda, gluten, allergy, intolerance, knead, combine.</p> <p>Can write a step-by-step recipe, including a list of ingredients, equipment and utensils.</p> <p>Can select and use a range of utensils and equipment accurately to measure and combine appropriate ingredients.</p> <p>Can make, decorate and present the food product appropriately for the intended user and purpose.</p> <p>Can carry out sensory evaluations of a range of relevant products and ingredients. Can record the evaluations using e.g. tables/charts/graphs such as star diagrams.</p> <p>Can understand how key chefs have influenced eating habits to promote varied and healthy diets.</p> <p>Can investigate famous manufacturing and engineering companies relevant to the project.</p>	<p>Know how to use utensils and equipment including heat sources to prepare and cook food.</p> <p>Understand about seasonality in relation to food products and the source of different food products.</p> <p>Know and use relevant technical and sensory vocabulary.</p> <p>Know which ingredients could be substituted.</p> <p>Using annotated sketches, discussion and information and communication technology if appropriate, ask children to develop and communicate their ideas.</p> <p>Ask children to record the steps, equipment, utensils and ingredients for making the food product drawing on the knowledge, understanding and skills learnt through IEAs and FTs.</p> <p>Evaluate the work as it progresses and the final product against the intended purpose and user reflecting on the design specification previously agreed.</p>	<p>Ingredients, yeast, dough, bran, flour, wholemeal, unleavened, baking soda, spice, herbs</p> <p>fat, sugar, carbohydrate, protein, vitamins, nutrients, nutrition, healthy, varied, gluten, dairy, allergy, intolerance, savoury, source, seasonality</p> <p>utensils, combine, fold, knead, stir, pour, mix, rubbing in, whisk, beat, roll out, shape, sprinkle, crumble</p> <p>design specification, innovative, research, evaluate, design brief</p>
	<p><b>Assessment of Skills</b></p> <p>Can children explore a range of ideas of food for a festival, linked to user and purpose?</p> <p>Can the children write a step-by-step recipe, including a list of ingredients, equipment and utensils?</p> <p>Can the children carry out evaluations of a range of relevant products and ingredients and can they record the evaluations using e.g. tables/charts/graphs such as star diagrams?</p>	<p><b>Assessment of Knowledge</b></p> <p><b>What meal did you make?</b> Pupils to recognise Asian dishes, for example noodle soup and milk bread.</p> <p><b>What ingredients did you use?</b> Ingredients for milk bread: bread flour, water, low fat milk, yeast, salt, sugar, egg and unsalted butter. Ingredients for noodle soup: vegetable stock, ginger, garlic, rice or wheat noodles, sweetcorn, mushrooms, spring onions, soy sauce, mint, and chilli.</p> <p><b>What equipment and utensils did you use?</b> Pupils to recognise the equipment they will need for example frying pan, bowl, how bread knives differ from other knives, spoons and the different chopping boards for the different food groups,</p> <p><b>Which food groups were used in the mean?</b> A balanced diet is made up of foods from five food groups: carbohydrates, fruits and vegetables, protein, dairy and fats.</p>	

**Foundations of previous learning:**

- Experience of basic stitching, joining textiles and finishing techniques.
- Experience of making and using simple pattern pieces.

**Unit Learning**

NC Objective - Coverage	Skills	Knowledge	Vocabulary
<b>Designing</b> <ul style="list-style-type: none"> <li>• Generate innovative ideas by carrying out research including surveys, interviews and questionnaires.</li> <li>• Develop, model and communicate ideas through talking, drawing, templates, mock-ups and prototypes and, where appropriate, computer-aided design.</li> <li>• Design purposeful, functional, appealing products for the intended user that are fit for purpose based on a simple design specification.</li> </ul> <b>Making</b> <ul style="list-style-type: none"> <li>• Produce detailed lists of equipment and fabrics relevant to their tasks.</li> <li>• Formulate step-by-step plans and, if appropriate, allocate tasks within a team.</li> <li>• Select from and use a range of tools and equipment to make products that are accurately assembled and well finished. Work within the constraints of time, resources and cost.</li> </ul> <b>Evaluating</b> <ul style="list-style-type: none"> <li>• Investigate and analyse textile products linked to their final product.</li> <li>• Compare the final product to the original design specification.</li> <li>• Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose.</li> <li>• Consider the views of others to improve their work.</li> </ul>	<p>Can generate innovative ideas by carrying out research including surveys, interviews and questionnaires.</p> <p>Can develop, model and communicate ideas through talking, drawing, mock-ups and prototypes and where appropriate, computer aided design.</p> <p>Can use correct vocabulary to show understanding:</p> <p>Seam, seam allowance, wadding, reinforce, hem, template, pattern pieces, fastening, authentic</p> <p>Can produce detailed lists of equipment and fabrics relevant to their tasks.</p> <p>Can formulate step-by-step plans and if appropriate, allocate tasks within a team.</p> <p>Can select from and use a range of tools and equipment to make products that are accurately assembled and well finished.</p> <p>Can investigate and analyse textile products linked to the final product.</p> <p>Can compare the final product to the original design specification.</p> <p>Can test products with intended user and critically evaluate the quality of the design, manufacture functionality and fitness for purpose.</p> <p>Can consider the views of others to improve their work.</p>	<p>Set an authentic and meaningful design brief. Children generate ideas by carrying out research using e.g. surveys, interviews, questionnaires and the web. Children develop a simple design specification for their product. <b>(Lulu Guinness) Vaho: Recycled bags Barcelona made from old advertising banners)</b></p> <p>A 3-D textile product can be made from a combination of accurately made pattern pieces, fabric shapes and different fabrics.</p> <p>Fabrics can be strengthened, stiffened and reinforced where appropriate.</p> <p>Communicate ideas through detailed, annotated drawings from different perspectives and/or computer- aided design. Drawings should indicate design decisions made, the methods of strengthening, the type of fabrics to be used and the types of stitching that will be incorporated.</p> <p>Produce step-by-step plans, lists of tools equipment, fabrics and components needed. Allocate tasks within a team if appropriate.</p> <p>Make high quality products applying knowledge, understanding and skills from IEAs and FTs. Incorporate simple computer-aided manufacture (CAM) if appropriate e.g. printing on fabric. Children use a range of decorating techniques to ensure a well-finished final product that matches the intended user and purpose.</p> <p>Evaluate both as the children proceed with their work and the final product in use, comparing the final product to the original design specification. Critically evaluate the quality of the design, the manufacture, functionality, innovation shown and fitness for intended user and purpose, considering others' opinions.</p> <p>Communicate the evaluation in various forms e.g. writing for a particular purpose, giving a well-structured oral evaluation, speaking clearly and fluently.</p>	<p>seam, seam allowance, wadding, reinforce, right side, wrong side, hem, template, pattern pieces</p> <p>name of textiles and fastenings used, pins, needles, thread, pinking shears, fastenings, iron transfer paper</p> <p>design criteria, annotate, design decisions, functionality, innovation, authentic, user, purpose, evaluate, mock-up, prototype</p>
		<b>Assessment of Skills</b>	<b>Assessment of Knowledge</b>
	<p>Can develop, model and communicate ideas through talking, drawing, mock-ups and prototypes and where appropriate, computer aided design.</p> <p>Can select from and use a range of tools and equipment to make products that are accurately assembled and well finished.</p> <p>Can test products with intended user and critically evaluate the quality of the design, manufacture functionality and fitness for purpose.</p>	<p><b>Describe the work of Vaho.</b></p> <p>Vaho make handmade bags, belts, wallets and tech cases that are crafted from upcycled advertisement flags hung from street lamps in Barcelona and Madrid, as well as truck tyres and recycled bicycle inner tubes.</p> <p><b>Explain how fabrics can be strengthened.</b></p> <p>How strong, durable or elastic the textile material is will depend on the fibre source and the construction method of the material or component. Weaker materials can be strengthened by laminating, bonding or quilting</p> <p>Laminating: Laminated cotton fabrics are made when two or more layers of fabrics are bonded together using a polymer film, this is what causes the laminate material to have its shiny effect.</p> <p>Bonding: In bonding the fibres are laid in a random pattern and are held together by adhesive (glue), or heated if made from synthetic fibres (ironed).</p> <p><b>Name the stitches and joining techniques you used.</b></p> <p>Simple Sewing Stitches: running stitch, basting stitch, backstitch, overcast stitch, invisible stitch, hemming stich and catch stich.</p> <p>Pupils will use a running stitch.</p>	

